



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/679,427	10/07/2003	John Taylor	24GA127054	3467

33727 7590 11/17/2006

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. BOX 8910
RESTON, VA 20195

EXAMINER

CHUNG, EUN HEE

ART UNIT PAPER NUMBER

2123

DATE MAILED: 11/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/679,427

Applicant(s)

TAYLOR ET AL.

Examiner

Eun H. Chung

Art Unit

2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) ☒ Notice of References Cited (PTO-892) | 4) ☐ Interview Summary (PTO-413) |
| 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) ☐ Information Disclosure Statement(s) (PTO/SB/08) | 5) ☐ Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) ☐ Other: _____ |

DETAILED ACTION

1. Claims 1-22 are presented for examination.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Geometric modeling for fissile system with Monte Carlo method.

Claim Objections

3. Claim 6 is objected to because of the following informalities: The phrase "the object" in line 2 would be better as "an object" or "object" to avoid the possible antecedent basis issue. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 15, 18, and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "desired" in claim 15, the term "much faster" in claim 18, and the term "effective" in claim 20 are relative terms which renders the claim indefinite. The term "desired",

"much faster ", and "effective" are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-14, 16, 19, 21, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Solid Edge (User's Guide of Solid Edge).

Solid Edge discloses (Claim 1) a modeling method comprising:

filling a first region with a single instance of a second set of regions regardless of a total number of the second set of regions that would be required to explicitly fill the first region (Pages 69 and 33, Chapter 2);

(Claim 2) a geometric construct for modeling systems comprising:

a generally rectangular body having curved surfaces on the generally rectangular body (Chapter 2) ; and

the generally rectangular body is configured to model objects based upon interstitial regions bounded by the curved surfaces (Chapter 2);

(Claim 3) the curved surfaces are configured having the shape of a portion of a surface of a cylinder (Page 34, Chapter 2);

(Claim 4) wherein the curved surfaces are configured having the shape of a portion of a surface of a sphere (Page 75, Chapter 2);

(Claim 5) wherein the curved surfaces are configured to allow for embedding of first objects formed by the interstitial regions within second objects (Chapter 2);

(Claim 6) wherein the curved surfaces are configured to allow for virtual filling the object formed by the interstitial regions into a second set of regions (Chapter 2);

(Claim 7) a method of modeling objects in a system comprising:
forming objects within a modeled system using interstitial regions between geometric units (Chapter 2), the geometric units having a plurality of concave surfaces thereon defining the interstitial regions (Chapter 2);

(Claim 8) forming cylindrical shaped objects using the interstitial regions (Page 34, Chapter 2);

(Claim 9) forming spherical shaped objects using the interstitial regions (Page 75, Chapter 2);

(Claim 10) embedding formed objects within other formed objects (Chapter 2);

(Claim 11) virtually filling a formed object within a modeled region (Chapter 2);

(Claim 12) a modeling method comprising:
arranging at least one of a first region or a first set of regions such that the first region or first set of regions contains at least one of a second region or a second set of regions (Chapter 2);
embedding at least one of the first region, a first set of regions, or first set of regions containing the second regions or the second set of regions into a complex third region individually or as an array, and so on to form a plurality of complex levels (Chapter 2);

Art Unit: 2123

(Claim 13) rotating a first set of regions as part of the embedding process (Page 435);

(Claim 14) including only a portion of the first region, first set of regions, first set of regions containing the second regions or the second set of regions, that lie within the complex third region into a model (Chapters 2 and 3);

(Claim 16) embedding a virtual fill region into the complex third region (Chapters 2 and 3);

(Claim 21) modeling a generally rectangular body having curved surfaces on the generally rectangular body (Chapter 2);

configuring the generally rectangular body to model objects based upon interstitial regions bounded by the curved surfaces (Chapter 2); and

allowing for virtual filling of an object formed by the interstitial regions into a second set of regions (Chapter 2);

(Claim 22) arranging at least one of a first region or a first set of regions such that the first region or first set of regions contains at least one of a second region or a second set of regions (Chapter 2); and

embedding at least one of the first region, a first set of regions, or first set of regions containing the second regions or the second set of regions into a complex third region individually or as an array, and so on to form a plurality of complex levels; and embedding a virtual fill region into the complex third region (Chapter 2).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Solid Edge (User's Guide of Solid Edge), in view of Shapiro et al. (US Pub No. 2004/0017369).

Solid Edge teaches most all of the instant invention as applied to claims 1-14, 16, 21, and 22 above.

Solid Edge teaches placing portions of two or more sets of the first region, first set of regions, first set of regions containing the second regions or the second set of regions, regions in the same spatial volume within the third complex region (Chapters 2 and 3), except desired material representation at each point in space.

Shapiro et al. teaches desired material representation at each point in space (Abstract, Col. 32 lines 34-60, Col. 37 lines 65-67, Col. 38 lines 1-14).

Solid Edge and Shapiro et al. are analogous art because they are both related to generating geometric modeling.

Therefore, it would have been obvious to one of ordinary skill in the art of at the time the invention was made to include material representation of Shapiro et al., with the method of generating geometric construct of Solid Edge because Shapiro et al. teaches highly automated geometric modeling (Col. 3 lines 45-53).

11. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Solid Edge (User's Guide of Solid Edge), in view of Kitamura et al. (US Patent No. 5,936,628).

Solid Edge teaches most all of the instant invention as applied to claims 1-14, 16, 21, and 22 above.

Solid Edge teaches describing a set of generalized geometry constructs and the complex third region (Chapter 2 and 3).

Solid Edge fails to teach quadratic surface equations.

Kitamura et al. teaches quadratic surface equations (Col. 13 lines 45-59).

Solid Edge and Kitamura et al. are analogous art because they are both related to generating geometric modeling.

Therefore, it would have been obvious to one of ordinary skill in the art of at the time the invention was made to include quadratic surface equations of Kitamura et al., with the method of generating geometric construct of Solid Edge because Kitamura et al. teaches advantages of the system that can be utilized effectively (Col. 3 lines 12-20).

Art Unit: 2123

12. Claim 18 -20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Solid Edge (User's Guide of Solid Edge), in view of Inverson (US H744).

Solid Edge teaches most all of the instant invention as applied to claims 1-14, 16, 21, and 22 above.

Solid Edge teaches (Claim 18) geometry constructs that exactly fill a complex third region (Chapter 2 and 3) and (Claim 19) formed objects (Chapter 2 and 3).

Solid Edge fails to teach (Claim 20) the neutron tracking being performed much faster than in normal operation;

(Claim 19) modeling a fissile system; and

(Claim 20) obtaining an effective neutron multiplication factor of the modeled system.

Inverson teaches (Claim 20) the neutron tracking being performed much faster than in normal operation (Col. 5 lines 60-68, Col. 6 lines 1-4);

(Claim 19) modeling a fissile system (Col. 5 lines 60-68, Col. 6 lines 1-4); and

(Claim 20) obtaining an effective neutron multiplication factor of the modeled system (Col. 5 lines 60-68, Col. 6 lines 1-4).

Solid Edge and Inverson are analogous art because they are all related to structural design.

Therefore, it would have been obvious to one of ordinary skill in the art of at the time the invention was made to include neutron multiplication factor in a fissile system of Inverson, with the method of generating geometric construct of Solid Edge because Inverson teaches safer design of processing and storage equipment (Col. 2 lines 14-32).

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Scheon disclose(s) honeycomb core structures of minimal surface tubule sections (US Patent No. 3663346).

Sekine et al. disclose(s) method of generating shape data (US Patent No. 5793373).

Nicholls disclose(s) method for determining a shape space for a set of molecules using minimal metric distance (US Patent No. 7110888).

Petrov et al. disclose(s) tools for 3D mesh and texture manipulation (US Pub No. 2001/0056308).

Chen et al. disclose(s) system and method of anatomical modeling (US Pub No. 2005/0018885).

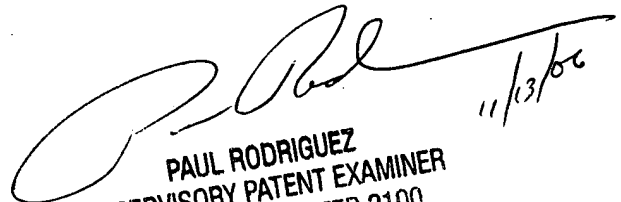
14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eun H. Chung whose telephone number is 571-272-2164. The examiner can normally be reached on 8:30am-5:00pm Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2123

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

EHC


PAUL RODRIGUEZ
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100
11/13/06